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Information Input Device and Its Method

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(71) Patent Assignee: Canon Company

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(54) [Name of the Invention]

Information Input Device and Its Method

(57) [Abstract]

[Problem]

The problem of this invention is to improve the user operational properties related to coordinate input.

[Solution Measures]

A guiding layer is placed on the image display surface of the display device 1. When the user contacts the guiding layer by the fingers of their right hand, the coordinate input of their contact position is conducted, and together with that the signal flows from the guiding layer to the information treatment device 10 as it passes through the guiding means 4 of the left hand of the user. By distinguishing the signal line through which the signal has been input the user who has performed the coordinate input is distinguished.

[Scope of the Claims]

[Claim 1]

Information input device that is an information input device characterized by the fact that the contact coordinate position by the corresponding contact of the fingers of multiple users is input through coordinate input means,

where the contact surface of the above described coordinate input means is made into a state where it can be guided,

and that is equipped with a signal generation means that imparts a signal used for discrimination relative to the above contact surface,

a guiding means whereby the signal guided by the contact of the fingers of the above described corresponding multiple users is guided correspondingly through the multiple signal lines, and a user detection means whereby by sensing the signal line where the relevant signal has been guided, the user that has input the above described coordinate position, is detected.

[Claim 2]

Information input device characterized by the fact that it is an information input device according to the above reported Claim 1 that then contains a display means that performs the display of the information, and on the image display surface of the above described display means the above signal guiding transparent guiding layer is placed so that the display of the above display means is not harmed.

[Claim 3]

Information input device characterized by the fact that it is an information input device according to any of the above reported Claim 1 or Claim 2 where the above signal is an AC signal, and the above described user detecting means is a device whereby the presence or absence of generation of the above described AC signal in the above described multiple signal lines is detected and the user discrimination is accomplished.

[Claim 4]

Information input device characterized by the fact that it is an information input device according to any of the above reported Claims 1 ~ 3 where the above described user detection means is a device where based on the timing of the generation of the above described signal and the timing of the input of the coordinate position from the above described coordinate input means, the user who has conducted the relevant coordinate position input, is distinguished.

[Claim 5]

Information input device characterized by the fact that it is an information input device according to any of the above reported Claims 1 ~ 4 where the above described coordinate input means is a infrared light type touch panel.

[Claim 6]

Information input method characterized by the fact that it is an information input method where through the corresponding finger contact of multiple users the contact coordinate positions are input by a coordinate input means,

Where the contact surface of the above described coordinate input means is made into a state where it can be guided,

The signals that are guided through the contact of the corresponding fingers of the above described multiple users are correspondingly guided through multiple signal lines,

And by detecting the signal line where the relevant signal has been guided, the user that has input the above described coordinate position is identified.

[Claim 7]

Information input method characterized by the fact that it is an information input method according to the above reported Claim 6 where the above described coordinate input method is placed on the image display surface that performs the information display, and on the contact surface of the above coordinate input means the above described signal guiding transparent guiding layer is provided.

[Claim 8]

Information input method characterized by the fact that it is an information input method according to any of the above reported Claims 6 or Claim 7 where the above described signal is an AC signal, and where the presence or absence of generation of the above described AC signal of the above described multiple signal lines is detected and the user discrimination is performed.

[Claim 9]

Information input method characterized by the fact that it is an information input method according to any of the above reported Claims 6 ~ Claim 8 where based on the timing of the generation of the above described signal and the timing of the input of the coordinate position from the above described coordinate input means, the user who has conducted the relevant coordinate position input, is distinguished.

[Claim 10]

Information input method characterized by the fact that it is an information input method according to any of the above reported Claims 6 ~ Claim 9 where the above described coordinate input means is an infrared light type touch panel.

[Detailed Explanation of the Invention]

[0001]

[Technical Field of the Invention]

The present invention is an invention about an information input device where information is input through the contact of the fingers of the operators etc., and it is an invention about its method.

[0002]

[Prior Art]

In recent years through the arrival of the large image display devices the applications of the display devices have been further expanded. For example, in the case of the

conferences conducted in offices, examples (precedents) have been observed where large image surface display devices have been connected to work stations or personal computers so that this display device can be viewed by the participating members. At this time it is possible to consider the method where the display device is used as a white board or a black board (vertical type) and the method where by the table assembly method the display device is placed on a horizontal surface and it is advantageously used as 2 ~ 4 users observe around it (horizontal method).

[0003]

Then, in the case of the horizontal type display device it is considered that it can be advantageously used not only in conferences but also for trump or mahjong, etc., games.

[0004]

Thus, by the arrival of the large image surface display devices the number of conferences, where a single display device is utilized by multiple users, has increased.

[0005]

In the case where, as described above, the display device is used for conferences or games, even though there are cases where keyboards or mice are used as the input devices, there are also many instances where touch panels or digitizers etc., coordinate indication devices can be easily implemented. Because of that, there are many suggestions pertinent to coordinate input devices like touch panels or digitizers etc.

[0006]

However, in the case when a single display device is utilized by multiple users, when the input is accomplished by contacting the touch panel by a finger, it is not possible to distinguish which user has provided the input. In the case when discrimination is required despite the fact that the input is provided by multiple users, for example, it is possible to consider that each user employs, for example, an electronic pen. An example of that is disclosed according to the reported in the description of the Japanese Patent Application laid Open Number Hei-Sei 6-59813. In the case according to this prior technology example, it is a case where an electronic pen is used and through the pen a code (a signal wiring used for discrimination) is issued.

[0007]

[Problem Solved By the Present Invention]

The problem that must be solved is that in the case when a single display device is used by multiple users and the information is input by contact through the fingers, it is said that it is not possible to distinguish which user has performed the input.

[0008]

Also, in the case when an electronic pen is used, it is necessary to solve the problem where it is said that the code from the pen is utilized. Especially, in the case of the large image surface display devices it is necessary that the code reaches to the edges of the image surface and because of that it is necessary that it becomes long. If the code is long it is twisted around another code, and there is the danger that the display content that is presented on the display surface would become difficult to view.

[0009]

Then, the goal of the present invention is to suggest an information input device where the coordinates displayed by the user fingers are detected and the operational properties are good and at the same time the user who is indicating them is also identified; another goal of the present invention is to suggest its method.

[0010]

[Measures In Order To Solve The Problem]

In order to achieve such goal the invention according to Claim 1 of the present invention is characterized by the fact that the contact coordinate position by the corresponding contact of the fingers of multiple users is input through coordinate input means, where the contact surface of the above described coordinate input means is made into a state where it can be guided, and that is equipped with a signal generation means that imparts a signal used for discrimination relative to the above contact surface, a guiding means whereby the signal guided by the contact of the fingers of the above described corresponding multiple users is guided correspondingly through the multiple signal lines, and a user detection means whereby by sensing the signal line where the relevant signal has been guided, the user that has input the above described coordinate position, is detected.

[0011]

The invention according to Claim 2 of the present invention is characterized by the fact that it is an information input device according to the above reported Claim 1 that then contains a display means that performs the display of the information, and on the image display surface of the above described display means the above signal guiding transparent guiding layer is placed so that the display of the above display means is not harmed.

[0012]

The invention according to Claim 3 of the present invention is characterized by the fact that it is an information input device according to any of the above reported Claim 1 or Claim 2 where the above signal is an AC signal, and the above described user detecting means is a device whereby the presence or absence of generation of the above described

AC signal in the above described multiple signal lines is detected and the user discrimination is accomplished.

[0013]

The invention according to Claim 4 of the present invention is characterized by the fact that it is an information input device according to any of the above reported Claims 1 ~ 3 where the above described user detection means is a device where based on the timing of the generation of the above described signal and the timing of the input of the coordinate position from the above described coordinate input means, the user who has conducted the relevant coordinate position input, is distinguished.

[0014]

The invention according to Claim 5 of the present invention is characterized by the fact that it is an information input device according to any of the above reported Claims 1 ~ 4 where the above described coordinate input means is a infrared light type touch panel.

[0015]

The invention according to Claim 6 of the present invention is characterized by the fact that it is an information input method where through the corresponding finger contact of multiple users the contact coordinate positions are input by a coordinate input means, where the contact surface of the above described coordinate input means is made into a state where it can be guided, the signals that are guided through the contact of the corresponding fingers of the above described multiple users are correspondingly guided through multiple signal lines, and by detecting the signal line where the relevant signal has been guided, the user that has input the above described coordinate position is identified.

[0016]

The invention according to Claim 7 of the present invention is characterized by the fact that it is an information input method according to the above reported Claim 6 where the above described coordinate input method is placed on the image display surface that performs the information display, and on the contact surface of the above coordinate input means the above described signal guiding transparent guiding layer is provided.

[0017]

The invention according to Claim 8 of the present invention is characterized by the fact that it is an information input method according to any of the above reported Claims 6 or Claim 7 where the above described signal is an AC signal, and where the presence or absence of generation of the above described AC signal of the above described multiple signal lines is detected and the user discrimination is performed.

[0018]

The invention according to Claim 9 of the present invention is characterized by the fact that it is an information input method according to any of the above reported Claims 6 ~ Claim 8 where based on the timing of the generation of the above described signal and the timing of the input of the coordinate position from the above described coordinate input means, the user who has conducted the relevant coordinate position input, is distinguished.

[0019]

The invention according to Claim 10 of the present invention is characterized by the fact that it is an information input method according to any of the above reported Claims 6 ~ Claim 9 where the above described coordinate input means is an infrared light type touch panel.

[0020]

[Practical Embodiment of the Present Invention]

Here below the figures will be elucidated and the practical embodiment state of the present invention will be explained in details.

[0021]

Figure 1 shows a situation where two users are employing the display device according to the practical embodiment of the present invention. Figure 1 represents the state viewed from the vertical top direction of the display device. In the case of this practical embodiment, as it is shown according to the presented in Figure 1, the display device is assumed to be a horizontal type device, and the display device 1 is used by two persons - user 2 and user 3.

[0022]

Regarding the user 2 and user 3, through in their left hands they have the guiding means 4, 5. The guiding means 4 and 5 are electro-conductive materials that can be attached to the wrist. To the electro-conductive means 4, 5, the wiring 6 and 7 is correspondingly connected, and at least one edge is connected to the user discrimination part (not shown in the figure) inside the later described information treatment device 10. The guiding means 4, 5 can be made from a conductor material and they are made so that they accomplish the guiding of the user body and the user discrimination part inside the information treatment device 10. The user discrimination (identification) part is described in details here below.

[0023]

On the display surface of the display device 1 the transparent electro-conductive layer 8 is placed so that there is no hindrance on the display on the one surface. On this electro-conductive layer 8, it is possible to impart the desired voltage through the electrode parts 9 that are at the edge parts of the display surface. Also, the information treatment device 10 is connected to the display device 1. The information treatment device 10 transfers the display image signal to the display device 1, and on the contrary, the later described user signal or the touch panel coordinate information, etc., are obtained from the display device 1 and a treatment is conducted. Also, the display surface of the display device 1 is made from an n infrared type touch panel. The touch panel is explained later.

[0024]

Then, the identification of the multiple users according to the present practical embodiment state (in the case according to Figure 1 – 2 persons) is explained.

[0025]

Figure 2 represents a side view of the input and display device according to this practical embodiment state. In the case of Figure 2, the same way as in the case of Figure 1, a state is shown where the user 2 indicates the display surface by their finger. In the case of Figure 2, 1 represents the display device (side view shown), 2a is the right hand of the user, 8 represents the electro-conductive layer, 9 represents an electrode, 20 represents the user identification part. 21 is an AC electrical source, 22 represents a wiring whereby the user signal (further described) is input to the user identification part 20, 23 represents the wiring whereby the indicated by the user coordinate information is input into the user identification part 20, 24 represents a wiring whereby the user signal that is utilized by the user 2 is input. The user identification part 20, in practice, is realized by a program inside the information treatment device 10. Then, here, the explanation state chart is described. The items with the same symbols as those in Figure 1 represent the same things.

[0026]

Here, for the user identification part 20, according to Figure 2, a four-user signal input wiring 22 is described. This has the meaning that the identification part can respond to up to 4 users. The user signal input wiring 24 connects the user identification part 20 and the user 2 guiding means. Regarding the other, user 3 signal input wiring, it connects the user identification part 20 and the other user 3 guiding means. Each wiring is a wiring used in order to input the user signal (described below) of each user into the user identification part 20. However, in the case of this practical embodiment state, because of the fact that there are only tow persons who are the users, only the user 2 input wiring and the user 3 input wiring are used.

[0027]

Also, regarding the coordinate information input wiring 23, it is a wiring that inputs the coordinate information from the described below touch panel to the user identification part 20. There are four input wirings 23 that correspond to the wiring 22. In other words, it is a situation whereby it is possible to identify (distinguish) the input coordinates of 4 points (four users). The action of the identification part 20 is described here below.

[0028]

The electro-conductive layer 8 on the display surface is connected with the electrode 9. The electrode 9 is connected to the AC electrical source 21. Because of that the electro-conductive layer 8 normally applies an electrical voltage signal (user recognition used signal). If the user finger comes in contact with this electro-conductive layer 8, the AC signal passes through the user body, passes through the guiding means, and reaches the user identification part 20. In other words, as shown according to the presented in Figure 1, if the user 2 contacts the electro-conductive layer through their right hand, the AC signal flows inside the body of the user 2, and it reaches the left hand of the user 2. The left hand of the user 2 is in contact with the guiding means 4, and because of that the AC signal is transmitted from the guiding means 4 to the user identification part 20. This AC signal is called user signal according to this practical embodiment state. Through this user signal the user identification part 20 judges which user has indicated the display surface.

[0029]

After that, an explanation will be provided regarding a method for detecting (sensing) the coordinates on the display surface that are indicated by the user. This practical embodiment state uses an infrared light type touch panel as the coordinate detection method. In Figure 3 an input and display device equipped with an infrared light type touch panel is shown. Figure 3(a) shows the state viewed from the direction of the display surface of the display device, and Figure 3 (b) shows the side view of the display surface.

[0030]

The input – display device (touch panel) 1 contains a light generation part 40 that is formed from a light generating diode that generates infrared light, and a light receiving part 41, which is formed from a photo-diode that receives the light generated by this light generating part 40; and through a user operation of touching the picture surface, the infrared light is interrupted and by that the coordinates that are indicated by the user are detected. The detected coordinate information is transferred to the above described user identification part. Moreover, for this touch panel it is also possible to use a low resistance layer type etc., other means, and that is a good option.

[0031]

After that, an explanation will be provided regarding the method whereby the above described user identification part connects the user and the coordinates (in other words, the method whereby it judges which user has indicated which coordinates).

[0032]

First, a case will be described where only one user is indicating by a finger on the display surface. In the case shown according to Figure 4, the case is shown where one user is indicating by a finger on the display surface and the signal is input to the user identification part 20. Here, the user 2 from Figure 2 is indicating on the display surface. According to Figure 4, 50 represents the user signal input wiring that is employed by the user 2, 51 represents the user signal (AC signal) of the user 2, 53 represents the coordinate information that is input at the same time as the user signal 51. The coordinate information 53 is the signal from the above described touch panel.

[0033]

In the case when the rise of the user signal 51 and the rise of the coordinate information 53 are simultaneous, the user identification part 20 judges that this coordinate information comes from the user 2.

[0034]

After that, an explanation will be provided regarding a method for detecting which user indicates which coordinate, in the case when multiple users are indicating on the display surface at the same time.

[0035]

Even though the users have become multiple persons, fundamentally, the detection method is the same as that in the case when one person is the user. In the case when multiple users indicate on the touch panel, the judgment as to which user is indicating which coordinates is performed by cross referencing the timing of the user signals and the timing of the coordinate information from the touch panel. In other words, when the rise of the user signal and the rise of the coordinate information from the touch panel are at the same time, it is judged that this coordinate information belongs to the user of the user signal.

[0036]

In Figure 5 the detection method is shown at the when 2 users (user 2 and user 3) contact their fingers simultaneously on the display surface. The user signal 51 of the Figure 5 (a) is the user signal of the user 2, and the user signal 55 is the user signal of the user 3. The input wiring 50 is the wiring used by the user 2, and one edge that is not shown in the figure is connected to the guiding means of the user 2. The input wiring 54 is the wiring used by the user 3. One edge that is not shown in the figure is connected to the guiding means of the user 3. The coordinate information 53 is the coordinate (x, y) information that is pointed by the user 2. The coordinate information 57 is the coordinate (x, y) information that is pointed out by the user 3. These coordinate information 53 and 57

according to Figure 5 are input from the input wiring 52 and 56 to the user identification part 20, however, the coordinate information input wiring 23 does not determine which user coordinate information is being input. Because of that it is necessary that it is detected which coordinate information is coming from which user. Here below this detection method will be explained.

[0037]

The judgment as to which coordinate information is coming from which user, for each of them, is performed, the same way as in the case of one person user, by the timing of the signal rise. This judgment method is shown according to the presented in Figure 5 (b). 51, 55 represent correspondingly the user signals of the user 2 and 3, 53 and 57 represent correspondingly the coordinate information of users 2 and 3. The rise of the coordinate information 53 is at the same time as the rise of the user signal 51. Also, the rise of the coordinate information 57 is at the same time as the rise of the user signal 55. By that the user identification part 20 detects that the coordinate information 53 comes from user 2 and that the coordinate information 57 comes from the user 3.

[0038]

For this detection method, a well-known signal detection device that recognizes the timing of the signal rise, for example, an electrical voltage detection device is used and this is detected. Because of that, at the time when two users are pointing on the display surface simultaneously, it is not possible to detect which user is indicating which coordinate information.

[0039]

According to the above described, in the case of the present invention, the user identification and the specification of the coordinates that are indicated by the user, are performed. Regarding the display device, it transfers the user signal and the coordinate information that is detected by the touch panel onto the user identification part. By that, the information treatment device can recognize which user has pointed which coordinate information on the display surface.

[0040]

One example of the system structure in order to practically realize the above-described coordinate input method, is presented according to the shown in Figure 6.

[0041]

In Figure 6, 101 represents the signal generating device that generates an AC signal (user signal) in order to impart an electrical voltage on the electro-conductive layer of the touch panel 102. 102 is the infrared light type touch panel, where a transparent electro-

conductive layer is provided on the display surface so that it does not harm or interfere with that surface.

[0042]

103 is a band that forms the structure of the electro-conductive means and it is fixed to the left hand of the user. Passing through the band 103 and the fingers of the right hand of the user, the user signal from the electro-conductive layer of the touch panel 102 is input to the signal detection device 105, through the signal wiring 104. For the signal detection device it is possible to use a comparator device or a band pass filter. The signal detection device 105 generates a detection signal (for example, bit "1" pulse signal) indicating the detection of the timing of the generation of an AC signal, namely, the timing of the rise, and the generation of user signal. In the case when there is no user signal generated, the signal detection device 105 generates a bit "0" detection signal. The above described detection signal is input into the input/output interface 109.

[0043]

The coordinate position information that is detected at the time when the electro-conductive layer of the touch panel 102, has been contacted, is input to the input/output interface 109 through the signal wiring 106. The input/output interface 109 maintains its content when each of the signals are input from the signal wiring lines. The CPU 106, at regular intervals, reads/receives the (input) signal that is preserved (maintained) in the input/output interface 109, and following the described later below treatment program the user identification and the coordinate information correlations, are accomplished.

[0044]

The ROM 107 contains the above described treatment program. The RAM 108 is used as a temporary memory for the calculations performed by the CPU 106.

[0045]

In Figure 7 the treatment content of the above-described treatment program is shown. The treatment program is reported in program words that are practically usable and can be received and read by the CPU 106. According to Figure 6, the CPU 106 reads and outputs (step S5) the detection signal for the presence or absence of user signal and coordinate information, that is maintained in the input/output interface 109.

[0046]

First, the presence or absence of the coordinate input (if there is a contact of the touch panel 102 by a user finger) is judged based on the value of the input coordinate information (step S10). In the case when the input coordinate information is within the range that is outlined by the touch panel 8, it is judged that there is a coordinate input,

and after that the guiding of the user signal in which signal wiring is judged based on the signal detecting the presence or absence of a user signal.

[0047]

In order to do that, the CPU 1 monitors the bit value of the user signal presence or absence-detecting signal for the first signal wiring. In the case when there is a bit "1" of the user signal presence or absence detecting signal, it is judged that a user signal has been guided through the first signal wiring, and the input coordinates (x, y) and the user identification information (numerical value 1), are correlated, and the (x, y, 1) data is memorized in the RAM 108 as input data (Steps 20 through 25). This input data is transferred to an application program, for example a game running program. The game running program converts the display content of the touch panel 102 in correspondence with the input data, and the game treatment is conducted.

[0048]

In the case when there is no guiding in the first signal wiring, the presence or absence of guiding in the subsequent 2, 3 etc., signal-wiring lines, can be evaluated (Steps S30 ~ S50). In the case when it is judged that there is guiding, the user identification number is matched with the input coordinate value, and this input data is memorized in the RAM 108, and it is transferred to the application program (output).

[0049]

In the case when even though there is a generation of coordinate information, a user signal is not detected (when the step S50 judges NO), because of the fact that the timing of the user signal and the coordinate input is not the same, it is judged as a noise input, and an input manipulation is not conducted.

[0050]

The above-described practical embodiment can be practically realized by another described below state.

[0051]

- 1) According to the above described practical embodiment state, an infrared light type touch panel was used as the coordinate input device/display device, however, it is possible to use a coordinate input device that can input coordinates through the contact of the fingers by multiple users. In this case, it is also a good option if the display device is a separate structure.

[0052]

- 2) The signal that is supplied to the electro-conductive layer of the touch panel is not limited to being an AC signal, and for example, it is possible to use other signals

like pulse signal, etc. In this case, it is a good option if a signal detection device is used in correspondence with the state of the signal.

[0053]

- 3) For the CPU 106, ROM107, RAM108 and the input/output interface 109 off the above described practical embodiment state, it is also a good option if the commonly used computers are employed, and it is also a good option if a game specific device is used.

[0054]

- 4) Regarding the shown according to Figure 7 treatment program, besides the ROM, it is also a good option if it is stored on a hard disc, and it is also a good option if it is recorded on a floppy disc, or CDROM etc., portable type recording media.

[0055]

[Results From the Present Invention]

As it has been explained here above, according to the inventions of claims 1, 5, 6 and 10, for example the user finger that is used for the coordinate input through the infrared light type touch panel does not become a hindrance to the signal line etc., operations and because of that the operational properties related to the coordinate input, are improved.

[0056]

According to the inventions in the claims 2, 7, by the use of coordinate input/display device such as touch panel, it is possible to conduct information input regarding the coordinate position related to the display as through a mouse, and because of that, it is possible to conduct a novel information treatment regarding a game between multiple persons etc.

[0057]

According to the inventions in the Claims 3, 8, an AC signal is used as the user signal and by that it is possible to form a structure where the circuit for the signal generation means is simple.

[0058]

According to the inventions in the Claims 4, 9, the property is used that the coordinate position input timing and the user identification recognition signal guiding timing become the same, and it becomes possible to correlate the input coordinate position and the user.

[Simple Explanation of the Figures]

[Figure 1]

Figure 1 is an explanation diagram that is a practical embodiment state of the present invention and it is a figure that shows the state where two users are utilizing the information input device.

[Figure 2]

Figure 2 is an explanation diagram explaining the user identification method.

[Figure 3]

Figure 3 (a) is a front view diagram of the infrared light type touch panel, (b) is a side view diagram of the infrared light type touch panel.

[Figure 4]

Figure 4 is an explanation diagram explaining the identification method in the case when there is one user who indicates on the display surface.

[Figure 5]

Figure 5 (a) is an explanation diagram explaining the identification method in the case when there are two users who are indicating on the display surface, (b) is an explanation diagram explaining the timing of the user signal and the timing of the coordinate information.

[Figure 6]

Figure 6 represents a block diagram showing the system structure of one practical embodiment according to the present invention.

[Figure 7]

Figure 7 is a block diagram showing the CPU106 treatment content.

[Explanation of the Symbols]

- 1.....display device
- 2, 3.....users
- 4, 5.....guiding means
- 6, 7.....wiring lines
- 8.....electro-conductive layer

9.....electrode
10.....information treatment device
20.....user identification part
21.....AC electrical source
22.....user signal input wiring
23.....coordinate information input wiring
24.....user signal input wiring used by user 2
40.....infrared light generation part
41.....infrared light receiving part
50.....user signal input wiring used by user 2
51.....user signal
52.....coordinate information input wiring
53.....coordinate information
54.....user signal input wiring used by user 3
55.....user signal
56.....coordinate information input wiring
57.....coordinate information

In Figure 5 (b):

1: user signal. 2: coordinate signal

In Figure 6:

102.....touch panel
101.....signal generation device

In Figure 7:

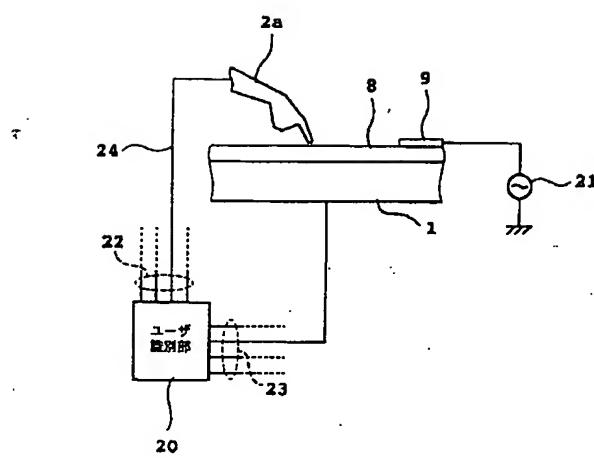
(1) constant frequency input, S5: input data read/output, S10: Coordinate information input generated?, S20: First signal line user signal guiding?, S30: Second signal line user signal guiding?, S40: Third signal line user signal guiding?, S50: Forth signal line user signal guiding?, (2) Return, S25: (x, y, 1) output, S35: (x, y, 2) output, S45: (x, y, 3) output, S55: (x, y, 4) output.

Patent Assignee: Cannon Company

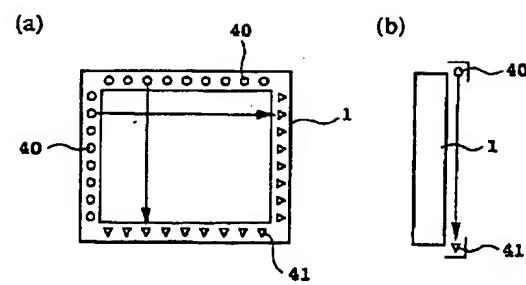
Translated by Albena Blagev ((651) 735-1461 (h), (651) 704-7946 (w))

07/23/03

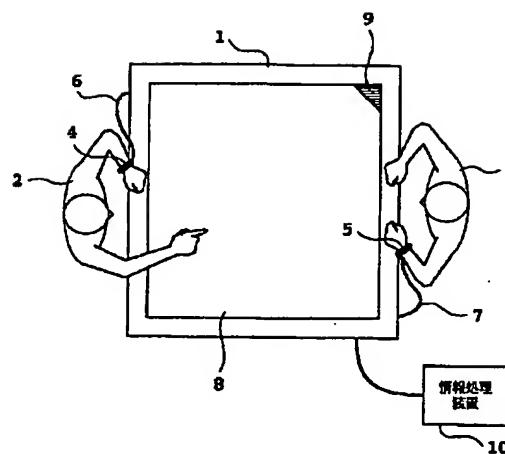
【図2】



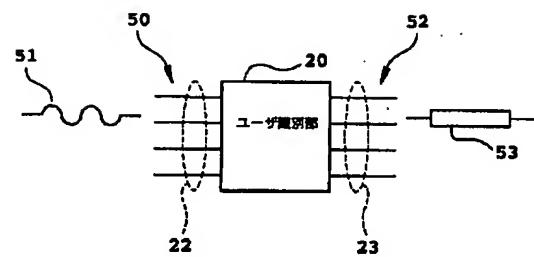
【図3】



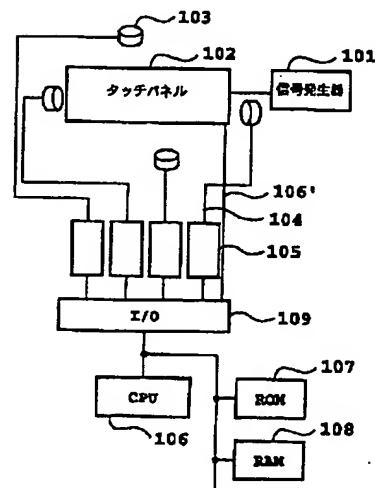
【図1】



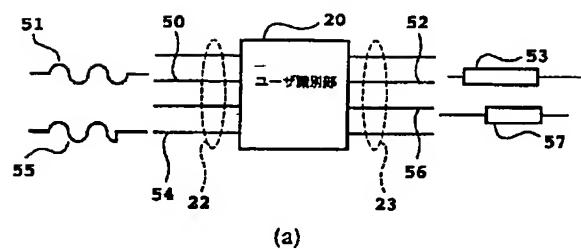
【図4】



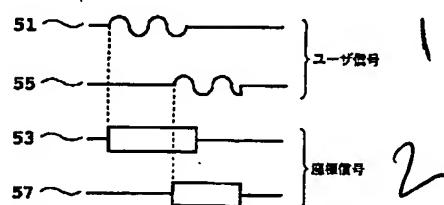
【図6】



【図5】



(a)



(b)

!(8) 000-148396 (P2000-14JL8)

【图7】

